

**CLAIMS**

Having thus described out invention, what we claim as new and desire to secure by Letters Patent is as follows:

- 1        1.        Process for producing a three-dimensional bioartificial tissue having  
2        viable cells in or on a matrix and with which the cells and matrix can be  
3        cultivated to a tissue or a precursor of it, comprising the steps of:  
4                inserting at least one vessel supplied from the outside into a tissue at  
5        the beginning of its production; and  
6                cultivating said tissue in a manner of hereby vessels propagate into the  
7        tissue and a vascularized bioartificial tissue is obtained.
- 1        2.        Process according to Claim 1, wherein vessels are of natural origin  
2        selected from the group consisting of humans and animals.
- 1        3.        Process according to Claim 1, wherein the vessel is a synthetic vessel,  
2        produced from a biologically compatible polymer.
- 1        4.        Process according to Claim 1, wherein the vessel has lateral openings  
2        departing from a longitudinally extended vessel lumen.
- 1        5.        Process according to Claim 1, wherein the vessel is a porous vessel. .
- 1        6.        Process according to Claim 5, further comprising the step of preparing  
2        the porous vessel punctually with a substance or means initiating a stimulus  
3        for vascular propagation.

- 1 7. Process according to one of Claims 1 further comprising the step of the  
2 vessel supplying perfused with blood or a culture medium.
- 1 8. Process according to Claim 7 wherein substances promoting  
2 angiogenesis, particularly growth factors, preferably VEGF (vascular  
3 endothelial cell growth factor) are added to the culture medium.
- 1 9. Process according to Claim 7 wherein the perfusion is accomplished  
2 under pressure.
- 1 10. Process according to Claims 7 wherein the perfusion is accomplished  
2 in pulses.
- 1 11. Process according to Claims 7 wherein the vessel is held between inlet  
2 and outlet lines needed for the perfusion so that it is simultaneously  
3 positioned and fixed in relation to the tissue being cultivated.
- 1 12. Process according to Claim 1 wherein cardiomyocytes are used as cells  
2 within the three-dimensional tissue to be vascularized, and the tissue obtained  
3 is a bioartificial heart tissue.
- 1 13. Process according to Claim 1 wherein keratinocytes are used as the  
2 cells, and the tissue obtained is a bioartificial skin tissue.
- 1 14. Vascularized bioartificial tissue, particularly obtained according to  
2 Claim 1 wherein at least one vessel passes through said tissue from which  
3 other vessels are propagated into the tissue.

- 1 15. Vascularized bioartificial tissue according to Claim 14 wherein in that  
2 vessel is selected from the group consisting of a vessel of natural origin from  
3 human or animal, and a biocompatible synthetic vessel.
- 1 16. Vascularized bioartificial tissue according to Claim 14 wherein the  
2 tissue is a synthetic heart tissue having cardiomyocytes in a matrix.
- 1 17. Vascularized bioartificial tissue according to Claim 14 wherein the  
2 tissue is a synthetic skin tissue having keratinocytes in a matrix.
- 1 18. Experimental reactor for controlled production of a bioartificial tissue,  
2 according to Claim 1, at least one tissue culture chamber; at least one inlet  
3 and outlet for said tissue culture chamber; and two opposite, plane, parallel  
4 and optically transparent boundary walls for said tissue culture chamber.
- 1 19. Experimental reactor according to Claim 18, further comprising at  
2 least one closable inlet and outlet for each chamber; and a closing means.
- 1 20. Experimental reactor according to Claim 18 wherein said tissue  
2 culture chamber includes a means for holding a matrix or a vessel.
- 1 21. Experimental reactor according to Claim 18 wherein said at least one  
2 inlet and one outlet hold a vessel.
- 1 22. Experimental reactor according to Claim 18 wherein at least one of  
2 the plane optically transparent boundary walls of the chamber is designed as a

3 lid.

1 23. Experimental reactor according to Claim 23 further comprising  
2 additional input points above each chamber in a replaceable lid.

1 24. Experimental reactor according to Claim 18 further comprising  
2 electrical connections and/or electrical components are provided in said at  
3 least one tissue culture chamber.

20220709 10:04:06